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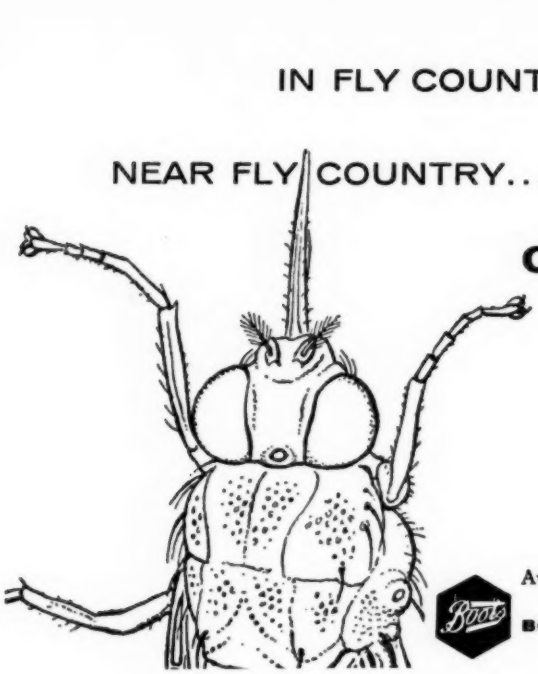

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THE VETERINARY RECORD

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The Economics of Journalism

THE proposed merger between two great newspaper and magazine-publishing groups, the bids and the counter bids have brought into the glare of publicity a state of affairs which has been developing since the end of the second world war: the cost of producing publications of every kind has increased remorselessly, and only the strongest, the most fortunate, or the highly specialised can survive. The journalistic field is littered with corpses, and the slaughter is not yet finished. On this occasion the threat that the national press will come under the control of even fewer persons has attracted the attention of the Government, but it is not easy to see what it can do. The cost of modern machinery, the levels of taxation, profits and wages, restrictive practices, the scandalously inflated price of newsprint, the steady increase in transport rates and fuel, are outside—with the possible exception of the latter—the authority of Parliament.

Nor has any journal a prescriptive right to existence. The fear is being expressed that a daily newspaper representing the views of one of the major political parties is in danger; should that be so it surely is for the members of that party to buy it in sufficient numbers to attract the amount of advertisement which, regrettably, is the only way of keeping a popular newspaper alive: the continuation of this, or of any other partisan journal whatever its politics is hardly the responsibility of the whole community.

It may bring home to those not familiar with the economics of journalism the alarming trends of the present, to mention that even in our own small and highly specialised publication the costs of production have more than doubled in the last decade; and it is fair in this connexion to pay tribute to our printers who have kept increased charges due to raw material rises and wage awards to the lowest practicable levels. Thanks to the loyalty of advertisers, increases in circulation, and the prudent housekeeping of the appropriate committees of the B.V.A. we still are able to give members a larger and far more costly VETERINARY RECORD as part of the service rendered to them by the Association. But, like much of the specialist press, we are in a partially protected position; it is far otherwise elsewhere.

A curious trait of British people is their ingrained feeling that printed matter ought to be made available to them either free or for a nominal charge. How many people buy books if they can borrow them? How many find *The Times* "too expensive" at the price each week of a packet of cigarettes or a pint of stout? Thus it may be doubted whether the mass of people is as concerned at the contraction of press ownership as the press would like to think. Cynics may observe that, having regard to the torrent of rubbish that pours from the printing machines day by day and week by week, the community would suffer no irreparable loss if part of it were dammed rather than damned; and certainly it would be interesting, if Northcliffe could return, to hear what he had to say about the developments of the mass circulation press of which he was an originator; but though casualties among some popular periodicals may be accepted without excessive regret except for the hardships suffered by those deprived of their employment, the cause of their demise is more serious. Expressed simply, it is that we are moving towards a state of affairs when only mass circulation, attracting mass advertisement, will make any publication viable; and to judge by the content of those periodicals whose circulations are the largest, such a state of affairs can hardly be in the public interest. Time will show whether, if the present trend reaches its logical conclusion what may be called the Northcliffe cycle—that is the production of journals not as serious contributions to the common weal but as vehicles of superficial entertainment—will turn full circle and we shall get back to an earlier age when people wanting responsible journalism were prepared to pay for it.

It may be asked what all this has to do with veterinary surgeons and with their Association. The answer would seem to be twofold. First they are interested, as members of a learned profession, in the well-being of the society in which they exercise their skill, in its sense of responsibility, and in the reflection of their calling by the larger organs of public opinion. Second, they are immediately interested in those economic pressures which bear upon their own publications, and it may be mentioned that Council, at its recent meeting approved certain adjustments in advertisement and subscription rates to bring income more into line with costs. But constant vigilance is as necessary on the economic as on the editorial front, and it may be that one day—what an acceptable innovation that would be—some reader will express his appreciation of what everyone takes for granted: that THE VETERINARY RECORD will arrive each week (roughly to time), enlarged, not too disreputably below what it used to be in the good old days, and costing members—no more than it did ten years ago.

A Mechanical Device for Making Blood Films

BY

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Equine Research Station of the Animal Health Trust, Newmarket

FOR many diagnostic procedures, especially those necessitating the demonstration of blood cells or parasites, good blood smears are essential. It requires much experience, constant practice and considerable manipulative dexterity when using the two slide method to be able to make thin, uniform, circumscribed, even and repeatable smears which can be suitably stained and will allow of the critical differentiation of cell details in the laboratory. It is the experience of most laboratory workers that very many blood films sent in for examination and opinion are valueless either because they are far too thick and uneven or because they are unfixed.

For most investigations the essentials of a good blood smear are that it should be thin and that it should "run out" about two-thirds of the way along the slide, that it should not reach to the edges of the slide since these are frequently the most useful part of the film and that it should be rapidly dried and fixed by chemical means, and except for certain bacteriological techniques, not by heat.

To produce such blood smears regularly by hand requires a surprisingly high degree of technical skill. If a comparison is to be made between a number of specimens, then spurious variations of a mechanical nature must be minimised. The faster a smear is made, the thicker it will be. Similarly, the more obtuse the angle between slide and spreader, the thicker the smear will be. The converse is true in both cases. It will be evident, therefore, that both speed and angle of the spreader will radically influence the formation of a blood film.

The purpose of this short communication is to draw attention to the most useful mechanical aid to making blood films described by Marks, Bailey and Gunz in 1950 since the apparatus appears to be unknown to the majority of the members of the veterinary profession.*

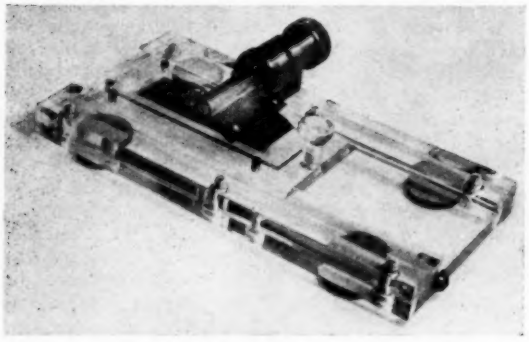

FIG. 1.—The Marks *et al.* blood film device with the tray pushed home so that the smear is made on the slide.

Most of the variables noted above can be reduced to a minimum, and the need for technical skill almost entirely eliminated by the use of the blood smearing machine described by these authors. The device is illustrated in Fig. 1. In essentials, this machine uses a rustless steel razor-blade as a spreader and an accurately machined slide carrier made in "Perspex." The spreader is spring loaded upon the moveable tray of the device. A "following" smear of any width can be made by using a suitable blade and this width will remain constant under all circumstances and in any hands until further adjustments are made. Clearly the angle of the spreader to the slide is also constant and the one remaining variable factor is the speed of spreading. This is largely controlled by the use of a relatively viscous lubricant and a "deliberate" movement of the tray when a smear is to be made.

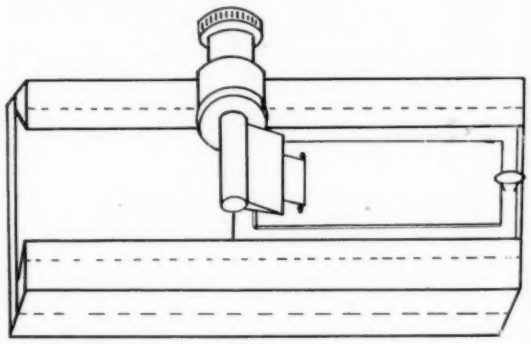

FIG. 2.—The Marks *et al.* blood film device with the tray fully advanced so that the drop of blood on the slide is in contact with the razor blade.

In use, a drop of blood of about 0.1 ml. is placed at one end of a clean, dust-free microscope slide and slightly spread across it. The slide is placed upon the tray of the machine and the tray is pushed backward until the drop of blood makes contact with the spreader knife blade and spreads fully along it (Fig. 2). By a single deliberate and steady movement the tray is pushed forward as far as it will go (Fig. 1) and a perfect smear is the regular result, which dries under ordinary conditions of humidity in about a minute.

A satisfactory means of fixation is to flood the

* This instrument is obtainable in limited numbers from Flemans and Martin, 36, Stanesfield Road, Cambridge.

slide with acetone-free methyl alcohol for about 30 seconds, pour off the excess and blot dry on clean blotting paper. Such a smear, wrapped in clean paper, will keep for some weeks for satisfactory laboratory examination. A smear so made should appear as in Fig. 3.

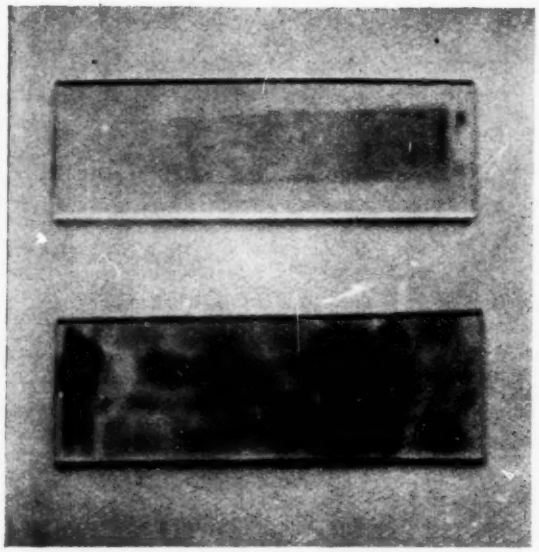

FIG. 3.—Above: a good smear made with the device. Below: a typical, and very bad, hand-made smear.

After use, the blade of the machine does not require dismantling to clean. When correctly employed, the drop of blood carried in the angle between blade and slide surface is self-exhausting, the smear "runs out" on the slide surface, and no trace of blood remains on the rustless steel surface of the blade. This enables a series of slides to be made one after another with great rapidity and accuracy. This advantage is of very great importance when a series of smears from the same or different samples of blood is required for comparative purposes. Cross contaminations do not occur when the Marks *et al.* smearer is correctly used. The authors have shown that a "battlement" differential leucocyte count of 200 cells made at the edge of a blood film produced in this way has very high accuracy. This technique has been in use at the Equine Research Station for about 6 years, and has proved exceedingly satisfactory for all routine and experimental purposes in which critical examinations of red and white corpuscles from peripheral blood and bone marrow fluid must be made. Untrained assistants can make good smears reliably and repetitively with the apparatus after a demonstration lasting only a few minutes. It is thought that the machine would have many advantages in examinations of blood smears for the presence of blood plasmodia in tropical or sub-tropical countries.

Reference

MARKS, J., BAILEY, N. T. J., & GUNZ, F. W. (1950). *J. Clin. Path.* **3**. 168.

Observations on the Serum Proteins of Afrikander, Mashona and Ngami Cattle

BY

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SUMMARY.—The serum protein and transaminases of Afrikander and Mashona cattle have been investigated and a highly significant difference in both relative and absolute value of gamma globulin were found. There was also a highly significant difference in the serum glutamic-pyruvic transaminase between the two breeds.

The serum proteins of 4 Ngami cattle are also reported and were found to have a very high gamma globulin and low albumen value.

The results and their significance are discussed.

Introduction

DURING recent years the desirability and value of improving breeds of cattle indigenous to tropical and sub-tropical countries has become more and more apparent. The value of *Bos indicus* varieties in this connexion are now well known in the Gulf Coast region of North America, Brazil, Indonesia, East Africa and Australia.

Indigenous breeds of cattle in Southern Africa to-day, consist of stock which have survived hundreds of years of primitive management, often in harsh

environments. They have been fully exposed, generation after generation, to the ravages of all the major diseases, and to droughts. It has been a case of survival of the fittest, and those which have survived are very likely to be admirably adapted to their environment.

We considered that a series of serum protein investigations would assist in understanding the abilities of indigenous breeds to meet the requirements of their environment.

Serum proteins in cattle are known to vary with age (Dimopoullos, Schrader & Fletcher, 1959; Zerzawy, 1958), infection with foot-and-mouth disease (Bradish, Henderson & Brooksby, 1954b), *Strongyloides papillosus* infestation (Turner, 1959), season (Ross, 1960), breed (Perk & Lobl, 1959) and oestrous cycle (Kreiter, 1956). Recent studies on human sera (Carr & Gelfand, 1960; Van Oye & Charles, 1957), have suggested that different planes of nutrition give rise to relatively large changes in serum protein levels and pattern.

Hence to compare results between different breeds, it is necessary to standardise conditions as far as possible. The Afrikander and Mashona groups were born on the same property in the same season, and fed identical rations since birth. The 2 groups had run together at all times, so it can be said that exposure to disease did not vary significantly and should not materially affect our results. Oxen were chosen to avoid changes due to the oestrous cycle and all blood samples were taken on the same day.

This standardisation did not apply to the Ngami group. In this case samples were sent from North West Bechuanaland, and results are included because of very large differences between the Ngami and others; differences almost certainly greater than that to be expected from these variations from the standard.

Materials

Blood serum was examined from 8 Afrikander, 8 Mashona and 4 Ngami cattle.

All serum samples were free from haemolysis, and stored at −4° C. until analysis could take place.

Methods

Total serum proteins determined by the microkjeldahl method (Milton & Waters, 1955). Fractionation was carried out by horizontal zone electrophoresis on filter paper (Whatman 3 mm.), the technique being the same as that used on human sera (Carr & Gelfand, 1960). The technique was rigidly standardised so that results could be validly compared, as considerable variation could be expected in minor changes of method.

Evaluation was made by direct densitometry (Elphon photoelectric densitometer) of the strips which were stained with naphthalene black 12B 200 and the areas of each component measured by planimetration.

Serum glutamic-pyruvic transaminase (S—GPT) and glutamic-oxalacetic transaminase (S—GOT) were determined by the method of King (1958).

Results

The results are given in Table I. Tests of significance were carried out by group comparison of the Afrikander and Mashona series and application of Students "t" test. The findings are expressed in terms of probability.

As has been found by many other investigators, it proved impossible to separate alpha globulin into two components.

Discussion

The results indicate that there is an appreciable difference in certain of the serum proteins and the

TABLE I
RESULTS OF BLOOD SERA EXAMINATION OF THREE BREEDS OF CATTLE

Breed	No. cattle sampled	Total protein g. per 100 ml.	Albumin per cent.	Albumin g. per 100 ml.	α Globulin per cent.	α Globulin g. per 100 ml.	β Globulin per cent.	β Globulin g. per 100 ml.	γ Globulin per cent.	γ Globulin g. per 100 ml.	S-GOT	S-GPT
Afrikander Mean	8	6·25	42·18	2·620	14·63	0·915	15·49	0·971	27·70	1·744	123·6	67·0
S.D.		±0·576	±5·643	±0·301	±1·728	±0·122	±2·712	±0·236	±3·784	±0·373	±11·24	±10·35
Mashona Mean	8	6·95	35·54	2·474	15·52	1·074	14·66	1·019	34·28	2·384	123·3	47·4
S.D.		±0·630	±5·079	±0·454	±1·974	±0·134	±1·763	±0·158	±3·928	±0·352	±22·11	±5·90
Tests of Significance		P ±0·04 Signif.	P ±0·04 Signif.	P >0·1 Not Signif.	P >0·1 Not Signif.	P ±0·04 Signif.	P >0·1 Not Signif.	P >0·1 Not Signif.	P <0·01 Highly Signif.	P <0·01 Highly Signif.	P >0·1 Not Signif.	P <0·01 Highly Signif.
Ngami	4	7·5	25·3	1·91	11·0	0·83	11·9	0·89	51·9	3·84	—	—
Range		6.60–9·22	21·4–26·9	1·33–2·47	9·5–11·9	0·63–1·08	9·8–14·0	0·65–1·08	43·5–58·3	3·26–4·57	—	—

NOTE.—Transaminase unit is that which will transform 1 μ mole of amino-acid to 1 μ mole of keto-acid in 1 hour at 37° C.
S-GOT = Serum glutamic oxalacetic transaminase
S-GPT = Serum glutamic pyruvic transaminase.
SD = Standard deviation.

S—GPT in 2 breeds of cattle kept under identical conditions, and suggest that a third breed shows considerable difference from the other two.

Total proteins

When the fractionation of the serum proteins is studied, it is important to consider both relative (percentages) and absolute (g. per 100 ml.) values together. In some cases a change in the total serum protein concentration gives rise to an apparent change in the relative value of one component, when its actual concentration remains the same.

Different techniques of electrophoresis may give rise to appreciably different results, and for this reason we feel that it would be unwise to compare our results too closely with those of others in this field. However, we feel we are justified in commenting, in the broadest sense, on differences and similarities.

A significant difference in the total serum protein of the Afrikander and Mashona is found. However, the spread of results is rather high, and with our small series it is doubtful whether the differences can be regarded as important. On the other hand the Mashona with the higher total protein and lower percentage of albumen has the same concentration of albumen as the Afrikander. The Ngami is considerably lower in both concentration and percentage than the other 2 breeds.

Studies on both human sera (Carr *et al.*, 1960; Linhard, Busson, Trapet, Giraud, Lecocq & Guyonnet, 1953) and cattle sera (Ross, 1960) have shown variations in serum proteins with season. Ross suggested that the difference between normal serum albumen in white Fulani (zebu) cattle taken during the rainy season and at the end of the dry season, was due to varying planes of nutrition, but the human studies suggest that climatic factors are also involved. It is proposed to repeat our series at different times of the year so that the factors involved may be more closely elucidated.

Albumen

It has been shown (West & Todd, 1957) that the albumen fraction of serum is responsible for most of the effective osmotic pressure and therefore constitutes the factor governing the water retaining capacity of blood plasma. This led Perk and Lobl (1959) to the conclusion that the thirst endurance of the Damascene breed might be partly due to its higher serum albumen level.

In our series this does not seem to apply fully. It is generally believed that the Afrikander or Lateral horned zebu was brought to South Africa by the Hottentot tribes which migrated south on the arid west coast, which is a more sparsely watered region than the East Coast, down which the Bantu tribes migrated southwards with their Sanga cattle of which the Mashona is a variety. The Ngami takes its origin from the Sanga, with probably an additional influence of lateral horned zebu blood, and has for centuries lived in the well watered area of the Okavango swamps. Thus the Afrikander, Mashona and Ngami are probably adapted to dry conditions in the above order, the Afrikander being the best adapted and the Ngami the least adapted.

Globulins

The alpha and beta globulins of the Afrikander and Mashona groups are similar, although a significant difference in the concentration of alpha globulin was noted. It is doubtful, however, whether this is of any importance. Even taking into account different techniques our figures are very similar to those published elsewhere for healthy cattle (Decker, McKenzie & McGuckin, 1959; Montemagno & Agresti, 1957; Venturoli, 1958; Zerzawy, 1958; and Bradish *et al.*, 1954a).

A highly significant difference in both relative and absolute gamma globulin levels are recorded between breeds. The clinically healthy Ngami has a remarkably high figure of over 50 per cent. with a concentration of 3.8 g. per 100 ml., but we are unable to comment adequately due to lack of standardisation of all conditions. The Mashona has a significantly higher level to that of the Afrikander and because serum transaminase results suggest no appreciable liver damage, it is considered the differences are mainly genetical.

Turner (1959) has described an increase in both and gamma globulins, peak levels occurring at 3 and 6 weeks respectively, following infestations with *Strongyloides papillosus*.

Bradish *et al.* (1954b) described a similar reaction of separate beta and gamma globulin rises following infection with foot-and-mouth disease virus, but not with vesicular stomatitis virus (1954c).

The association of antibodies with gamma globulins, has led to speculation regarding levels of these globulins relative to the immune status, but we consider that although this may be an important factor, other factors are involved which are likely to alter levels considerably. Some elucidation of these questions is likely when more refined techniques are available for the further separation of the globulins.

Serum transaminases

The transaminases are important enzymes involved in liver function. It has been shown (Meister, Sober & Peterson, 1952) that animal transaminase is activated by crystalline pyridoxamine phosphate and that the serum of pyridoxine (vitamin B_6) deficient rats and young men and women is low in the serum transaminases (Babcock, Brush & Sostman, 1960).

Compagnucci (1959) found that increase in serum transaminase activity was found in heavy *Echinococcus* and *Fasciola* infestation, and in human sera these enzymes show a large increase in hepatic diseases (Pryse-Davies & Wilkinson, 1958).

Venturoli (1958) found an increase in gamma globulin with echinococcosis and many references can be found on the increase in gamma globulin in human hepatic disease. In our results an interesting point is that there was an inverse relationship between the levels of gamma globulin and S—GPT in the 2 groups, with no significant difference between the S—GOT levels.

Acknowledgments.—We are grateful to Dr. E. Krog, of Maun, Ngamiland, for the Ngami sera and to Mr. C. H. French for assistance in obtaining the Afrikander and Mashona sera. Mr. J. MacKinnon,

(*Concluded at foot of page* 100)

The Treatment of Lameness in Horses by Faradism: a Report on One Hundred Cases

BY

A. C. FRASER

Wokingham, Berks.

SUMMARY.—A Table is presented giving some details of 100 horses suffering from lameness or defective action resulting from injuries to muscles, which were treated by an electrical current causing rhythmical muscular contractions. In each case the injured muscles were found to be more sensitive than the surrounding healthy muscles. A graded course of treatment by the same form of faradic current restored normal function to the damaged muscles so that 88 of the animals became sound in action. The 12 cases are discussed in which lameness persisted or recurred.

Introduction

REPORTS on the results of faradism applied to conditions in man led to the belief that this might be a suitable treatment for horses where lameness could be traced to muscle injury. Following the technique described by Strong (1956) this was found to be the case, and it was decided to keep records of a number of animals treated in this way.

Selection of Cases

For the consecutive series of 100 cases reported in the accompanying table, horses were accepted for treatment on 3 conditions:—

(1) That the animal was actually lame or defective in action in some way (such as restricted extension in a horse in training or faulty turning in a polo pony);

(2) that causes of lameness other than muscle injury were excluded as far as possible by clinical examination, including radiography and nerve-block whenever necessary; and

(3) that preliminary examination by faradic current elicited a painful response from a muscle or a group of muscles.

The Electric Current

The current used was a rhythmically surged faradic current at a surge frequency of 60 to 80 per minute. Current was obtained from a 12-volt battery and was suitably adjusted by an apparatus designed for use with large animals.* The apparatus includes a control panel carried on a belt around the operator's waist by which the speed of the surges and the strength of the current can be varied. The working current, except for momentary impulses, remains well below 100 volts and the amperage is in negligible thousandths. There is no heating effect. Particulars of the current used and of the type of apparatus required for its production are clearly described in Part B of Osborne and Holmquist's *Technic of Electrotherapy*.

* Messrs. Seta Ltd.

Tragacanth mucilage, which is both a lubricant and a conductor, is smeared on the area to be investigated. The current reaches the horse through an active electrode in the form of a small pad held in the hand. The indifferent electrode is included in a large pad placed on the horse's back over a porous sheet soaked in saline and is kept in place by a roiler. Contractions are observed when the active electrode is firmly pressed on a muscle. The electrode may be allowed to cause about 10 contractions at one point and should then be moved by sliding it to another position. The strength of the current is varied until the muscles are contracting strongly but comfortably. In cases of injury one or more muscles are found to be particularly sensitive. If these muscles are stimulated at intervals they gradually become less sensitive and eventually lameness is reduced or disappears. The explanation given for this effect in man (Mennell, 1945; Smart, 1933) is the dispersal of effusions or, in older cases, the freeing of adhesions.

Discussion of the Table of Cases

"Reported Disabilities"

In the cases presented for treatment in this series the period during which lameness had been present varied from 1 day to over 18 months with an average of about 4½ months. Treatments given to the successful cases varied from 1 to 30 with an average of 9 treatments, but the number of cases is too small and the type of injury too diverse for conclusions of any significance to be drawn from average figures or percentages. Accurate details of the original injuries and early treatment were difficult to obtain in a number of the chronic cases.

"Pain Exhibited"

At a preliminary examination of each case the muscles of the suspected area were stimulated until a muscle or a group of muscles was detected which was particularly sensitive. This sensibility is revealed in two ways: with the same strength of current the injured muscles contract more vigorously than the undamaged ones; and the horse indicates discomfort or pain by moving away from the electrode or by fidgeting, turning his head or raising one of his feet from the ground. It was quite unusual to find a muscle sensitive in isolation. After an injury, pain would seem usually to be distributed in a group of muscles, one being very sensitive and its neighbouring muscles more than normally responsive.

"Number of Treatments"

Having identified the injured muscle or muscle group, a course of treatment was given until soundness of action was restored or until the case had to

be abandoned for one reason or another. Treatments were given 3 or 4 times a week. At each treatment the area including the injured muscles was stimulated for 30 to 40 minutes, sliding the electrode gently from point to point. Treatments began by using a weak current and causing feeble contractions; the current was then gradually increased until the horse began to exhibit discomfort. In favourable cases stronger current could be used at each treatment before pain was shown, until eventually the injured muscles could take the same current as nearby normal ones.

Exercise

During the period it was under treatment, each horse was exercised daily as strongly as possible. Severely lame animals might at first only be capable of walking a few steps several times a day, but slightly lame cases were given walking and trotting on soft ground and were sent on road work as soon as they could do this without deterioration in their condition. Animals that were not actually lame and those well on the way to recovery were given full work according to their capacity—up to 6 miles a day walking and trotting on the roads, and, for horses in training, suitable canters and fast work—so that many of them were fit for racing, hunting or polo when they left the hospital stables.

"Results"

The results column gives details of the subsequent performance of some of the 88 successful cases. These are included as being of some general interest and to confirm that, in most cases, improvement was of a permanent nature. In one case, No. 12, a relapse occurred, but further treatment effected a satisfactory and lasting recovery.

The Failures

It may be of value to attempt to define why the 12 failures were unsuccessful.

Replacement of Muscle by Fibrous Tissue (Nos. 11, 25, 49 and 73)

The *post-mortem* examination on case No. 49 gave a clear reason for failure. Half the deep digital flexor muscle was almost entirely converted into fibrous tissue which could, under no circumstances, have reverted to normal contracting muscle. The fibrosis was, quite simply, too severe and therefore incurable. Nos. 25 and 73, in which no improvement was effected and on which *post-mortem* examinations were not carried out, may have been similar cases. No. 11, which continued to run and win, in spite of her disability, may have been a minor example of the same condition.

Repeated Relapses After Temporary Relief (Nos. 1 and 71)

Case No. 1 was actually hunted sound several times during treatment but lameness kept recurring. Similarly No. 71 could only be kept sound by repeated treatments. If adhesions were the cause of lameness in these cases it might be that they became stretched during treatment, but not broken or separated, so that relief was only temporary.

Relapse in a Case of Multiple Injuries (No. 16)

Case No. 16 was a great disappointment. The damage to the muscles of the hind leg was very extensive and, in addition, the calcaneometatarsal ligament was badly torn, and the attachment of the superficial flexor tendon was displaced from the point of the hock. The case was received, on 3 legs, for treatment immediately after the accident and recovery was eventually complete except for the curb and the displaced tendon. The gelding was sound in action and stood up to a long course of training including jumping but lameness returned in his first race and he was put down.

Cases Complicated by Bone Lesions (Nos. 22 and 45)

These were both cases in which it was revealed, on *post-mortem* examination, that bone injury had occurred. In No. 22 a large quantity of effusion in the upper leg was dispersed and the filly's action was greatly improved, but lameness persisted. She was not of sufficient merit to be sent to stud without some racing success so she was destroyed. Clinical examinations, including radiography, had failed to reveal the ulceration on the patella.

No. 45 was apparently cured and was sound in action when discharged. It was only when he was jumped out hunting that it was shown that a cure had not been effected and he was put down. Clinical examination had failed to detect arthritic changes in the lumbar vertebrae and, it is now realised, the gelding should not have been discharged without putting him to test in the work for which he was required, which was to include jumping.

Hypersensitivity (No. 8)

No. 8 was the exception to the finding that horses do not resent faradic treatment. This pony was vicious and difficult to approach and seemed to have such a sensitive skin that adequate treatment could not be applied.

Cases Withdrawn (Nos. 87 and 92)

Both these animals were making some progress under treatment but, in each case, as it became clear that the horse would not be ready for the particular period during which he was required for racing, the owner decided to discontinue the faradic treatment and try the effects of a summer at grass.

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Case number	Type	Reported disability	Pain exhibited in :—	Number of treatments	Result
1	Aged, T.B., b.g. (Hunter)	Lame left fore leg for 18 months	*Brachiocephalicus* and serratus cervicis, left side	10	After treatment hunted 3 times when condition returned. Destroyed. No P.M. Possibly too strong fibrous adhesions.
2	6 y.o., T.B., b.g. (Hunter)	Lame right hind leg for 6 months	*All adductors* and semimembranosus right side	23	Normal action restored.
3	Aged, T.B., b.g. (Hunter)	Lame right fore leg for 6 months	Brachiocephalicus, supraspinatus, *anterior pectorals*, and deltoid, right side	10	Normal action restored.
4	3 y.o., T.B., b.f. (Racehorse, flat)	Lame left fore leg for 1 month	*Anterior pectorals*, *brachiocephalicus* and supra-spinatus, left side	6	Normal action restored. Raced within 1 month of discharge and subsequently ran 3 times.
5	3 y.o., T.B., b.f. (Racehorse)	Lame left fore leg for 12 months	Posterior pectorals and *latissimus dorsi* left side	14	Normal action restored. Raced within 1 month of discharge and subsequently ran 5 times. Won 1 race and was placed in 2 others.
6	Aged, b.m. (Polo pony)	Lame left hind leg for 18 months. Old injury to suspensory ligament. Blistered and later pin fired	Gastrocnemius, soleus, *superficial* and *deep digital flexors*, left hind leg.	12	Normal action restored. Played polo within 1 week of discharge and subsequently has not missed a planned chukka in 3 seasons.
7	3 y.o., T.B., b.c. (Racehorse, flat)	Wrenched back, lame left hind leg for 3 months. Gross wasting of left back muscles	*Longissimus dorsi*, serratus dorsalis and longissimus costarum, left side	10	Normal action restored. Raced and won within 1 month of discharge. Subsequently ran 7 times being placed 4 times.
8	Aged, b.m. (Polo pony)	Lame left fore leg, on arrival in this country	*Brachiocephalicus*, left side	12	No improvement. Too highly strung for a reasonable amount of treatment to be applied.
9	Aged, b.m. (Polo pony)	Lame left fore leg for 3 months	*Anterior pectorals*, and brachiocephalicus, left side.	8	Normal action restored, Played polo day following discharge
10	11 y.o., T.B., b.g. (Racehorse, n.h.)	Lame right hind leg for 7 weeks. Possibly wrenched back	Serratus dorsalis, *Longissimus dorsi* and *gluteus medius*, right side	4	Normal action restored. Raced within 3 days of discharge.
11	2 y.o., T.B., ch.f. (Racehorse, flat)	Very slightly lame right fore leg for 6 months	Anterior pectorals, right side	6	No improvement. Returned to training and actually ran and won but condition remained.
12	3 y.o., T.B., b.c. (Racehorse, flat)	Very restricted shoulder action since foalhood	Posterior pectorals and *latissimus* dorsi, both sides	16	Free action achieved. Raced within 12 days of discharge. Lost action again, but further 6 treatments restored the action. Subsequently ran 8 times, won 2 and was placed 3 times. Had previously no racing success.
13	2 y.o., T.B., b.f. (Racehorse, flat)	Lame right fore leg for some months. Old fracture right pisiform bone. Pin fired 4 months previously. Knee flexion limited by about 30 per cent.	All flexor muscles of right knee	12	Normal action restored. Afterwards ran 6 times and was placed 3 times.
14	5 y.o., T.B., b.h. (Racehorse, flat)	Poor hind action for 4 months. Possibly wrenched back	*Longissimus dorsi*, costarum dorsi and serratus dorsalis, right side	10	Normal action restored. Raced within 1 week of discharge and subsequently ran 12 times. Winning once and was placed 3 times.
15	2 y.o., T.B., g.f. (Racehorse, flat)	Lame left fore leg following severe chest wound	Anterior pectorals left side	3	Normal action restored. Returned to training.
16	5 y.o., T.B., b.g. (Racehorse, n.h.)	Very severe sprain right hock. Very lame right hind leg. Received from race-course direct	Practically all muscles of right hind leg, *Adductors*	30	Normal action restored. Brought up to fast work and jumped. Sound for 12 months, but went lame again during 1st race. Destroyed.
17	6 y.o., T.B., ch.g. (Racehorse, n.h.)	Slipped on ice. Lame left hind leg for 1 month	Semimembranosus, *semitendinous*, and biceps femoris, left side	14	Normal action restored. Raced within 5 days of discharge.
18	3 y.o., T.B., b.g. (Racehorse, flat)	Lame right fore leg for 3 months	*Posterior pectorals* and latissimus dorsi, right side	16	Normal action restored. Raced within 1 month of discharge and subsequently ran 7 times, winning twice and was placed twice. Has since won over hurdles.

Case number	Type	Reported disability	Pain exhibited in :—	Number of treatments	Result
19	3 y.o., T.B., ch.f. (Racehorse, flat)	Lame left hind leg for 1 month	Biceps femoris left side	6	Normal action restored. Subsequently raced 4 times, being placed on each occasion.
20	3 y.o., T.B., g.f. (Racehorse, flat)	Lame right hind leg for 2 months	Biceps femoris, *semitendinous* and semimembranosus, right side	6	Normal action restored. Raced within 6 weeks of discharge and subsequently ran 6 times.
21	Aged, b.g. (Cob-Hunter)	Lame right hind leg for 6 months	All adductors right hind leg. *Sartorius*	16	Normal action restored.
22	6 months old, T.B., b.f.	Lame left hind leg for 2 months	All abductors, tensor fascia lata, *rectus fem'*, *vastus intern'*, *vastus ext'* and biceps fem'.	20	Considerable improvement. Never quite sound. Destroyed. *P.M.* showed ulcerated patella.
23	Yearling, T.B., b.f. (Racehorse, flat)	Severe haematoma right quarter	*Gluei* and biceps femoris, right side	7	Haematoma dispersed. Returned to training and subsequently raced 4 times, being placed once.
24	6 y.o., T.B., b.m. (Racehorse, n.h.)	Lame left fore leg for 2 months	Anterior pectorals and *brachiocephalicus*, left side	6	Normal action restored. Raced within 14 days of discharge and has since won.
25	Aged, g.g. (Hunter)	Lame right hind leg for some months	All adductors right hind leg (*Gracilis*)	10	No improvement. Destroyed. No *P.M.*
26	Aged, b.g. (Heavyweight Hunter)	Lame left hind leg for 2 months	Serratus dorsalis, longissimus dorsi and *glut' medius*, left side	4	Normal action restored.
27	6 y.o., T.B., b.m. (Racehorse, n.h.)	Lame right fore leg for 2 months	Anterior pectorals, left side	8	Normal action restored. Returned to training. Has since raced and won.
28	3 y.o., T.B., br.g. (Racehorse, flat)	Lame right fore leg for 12 months	Posterior pectorals and *latissimus* dorsi, right side	12	Normal action restored. Raced within 2 months of discharge. Has since run 6 times being placed 3 times.
29	3 y.o., T.B., b.f. (Racehorse, flat)	Lame right hind leg for 12 months	Adductors and *semimembranosus*, right side	3	Normal action restored. Raced within 3 weeks of discharge and subsequently ran 3 times.
30	2 y.o., T.B., ro.c. (Racehorse, flat)	Severely jarred shoulders. Very poor front action for 3 months	Posterior pectorals and *latissimus dorsi*, both sides	6	Normal action restored. Returned to training. Has since raced 4 times, being placed 3 times.
31	Aged, b.m. (Polo pony)	Dragged right hind leg on fast turning to right	Serratus dorsalis and *longissimus dorsi*, right side	4	Normal action restored.
32	2 y.o., T.B., b.g. (Racehorse, flat)	Lame right fore leg for 2 weeks	Anterior pectorals and *brachiocephalicus*, right side	18	Normal action restored. Raced within 10 days of discharge and was placed. Has since run many times on the flat and has won over hurdles.
33	7 y.o., T.B., ch.g. (Racehorse, n.h.)	12 months history of recurring sprain of left fore suspensory lig' whenever put to fast work	All flexor muscles of left forearm	21	Normal action restored. Raced within 14 days of discharge and was placed. Won 1 week later.
34	7 y.o., T.B., b.g. (Show hack)	Lame left hind leg for 6 weeks	All adductors and *semimembranosus* left hind leg.	12	Normal action restored. Won at important show within 1 month of discharge.
35	5 y.o., T.B., b.g. (Racehorse, flat)	Severely jarred shoulders. Very poor front action for some months	Posterior pectorals and *latissimus dorsi*, both sides.	11	Normal action restored. Raced and placed within 1 month of discharge.
36	Aged, b.g. (Hunter)	Lame right fore leg for 6 months	Brachiocephalicus, right side	10	Normal action restored.
37	6 y.o., T.B., ch.g. (Hunter, P.-to-P.)	Lame right fore leg for 2 months	Anterior pectorals, *deltoid* and supraspinatus, right side	10	Normal action restored.
38	8 y.o., T.B., b.g. (Show hunter)	Lame left hind leg for 10 days	Semitendinosus and *biceps fem'*, right side	4	Normal action restored. Won at important show within 2 months of discharge.
39	10 y.o., b.m. (Polo pony)	Severely jarred shoulders. Crippled front action for some months	Posterior pectorals and *latissimus dorsi*, both sides	20	Normal action restored.
40	8 y.o., T.B., b.g. (Hunter-chaser)	Lame left fore leg for 1 week. Strain of knee joint	All extensor muscles of left knee	10	Normal action restored. Has since raced many times including at least one win.
41	11 y.o., T.B., b.g. (Polo pony)	Lame, on and off, left fore leg for 12 months	Posterior pectorals and *latissimus dorsi*, left side	11	Normal action restored.

Case number	Type	Reported disability	Pain exhibited in :—	Number of treatments	Result
42	10 y.o.,T.B., b.g. (Hunter)	Lame right fore leg for 14 days	*Anterior pectorals, brachiocephalicus* supraspinatus and deltoid, right side	6	Normal action restored.
43	11 y.o., T.B., b.g. (Racehorse, n.h.)	Wrenched back. Lame right fore leg for some weeks	*Serratus dorsalis*, longissimus dorsi, *serratus thoracis* and *latissimus dorsi*, right side	5	Normal action restored. Raced within 1 month of discharge.
44	7 y.o., T.B., ch.g. (Hunter, P.-to-P.)	Lame right hind leg for some months	Gluteus superficialis and *biceps fem'*, right side	6	Normal action restored. Won point-to-point within 1 month of discharge.
45	11 y.o., g.g. (Hunter)	Lame right hind leg for some months	Serratus dorsalis, longissimus dorsi and *gluteus medius*, right side	9	Normal action on discharge. Condition recurred within 14 days. Destroyed. *Post mortem* showed osteo-arthritic changes in lumbar spine.
46	Yearling, T.B., br.f. (Racehorse, flat)	Lame right fore leg for 2 months	Anterior pectorals, *biceps brachii*, *brachialis* and deltoid	6	Normal action restored.
47	2 y.o., T.B., br.f. (Racehorse, flat)	Lame right fore leg for 14 days	*Biceps brachii, brachialis* and deltoid	11	Normal action restored. Returned to training and has since raced.
48	5 y.o., T.B., b.m. (Racehorse, n.h.)	Unable to jump when mounted. Possibly old injury to back	Serratus dorsalis, longissimus dorsi and *gluteus medius*, both sides	2	Normal action restored. Jumped freely with rider. Raced and won within 1 month of discharge.
49	8 y.o., T.B., ch.g. (Racehorse, n.h.)	Very lame right fore leg each time after work. Severe fall 10 months previous	Lateral digital extensor and all flexor muscles of right forearm	8	No improvement. Destroyed. *Post mortem* showed dense adhesions forming hard fibrous core in muscle.
50	2 y.o., T.B., g.c. (Racehorse, flat)	Lame left hind leg for some months	All adductor muscles of left hind leg. (*Sartorius*)	20	Normal action restored. Returned to training and has since raced.
51	2 y.o., T.B., br.f. (Racehorse, flat)	Very lame right fore leg for 3 months	*Anterior pectorals*, biceps brachii and brachialis. right side	11	Normal action restored. Returned to training.
52	6 y.o., T.B., b.m. (Racehorse, n.h.)	Lost action behind following slip on road	*Longissimus dorsi* and gluteus medius both sides	4	Normal action restored. Returned to training.
53	7 y.o., T.B., b.g. (Racehorse, n.h.)	Jarred shoulders. Very restricted action in front	Posterior pectorals and *latissimus dorsi*, both sides	5	Normal action restored. Returned to training and has since raced.
54	7 y.o., T.B., b.g. (Show hack)	Lame right hind leg for 1 month	Semimembranosus and *semitendinosus*, right side	4	Normal action restored. Won at important show within 1 month of discharge.
55	7 y.o., b.m. (Polo pony)	Lame right hind leg for some months	Serratus dorsalis, longissimus dorsi and *gluteus medius*, right side	11	Normal action restored.
56	7 y.o., T.B., b.g. (Racehorse, n.h.)	Lame right fore leg for 1 month	Anterior pectorals, right side	3	Normal action restored. Returned to training.
57	4 y.o., T.B., b.c. (Racehorse, n.h.)	Lame right fore leg for 6 weeks	Posterior pectorals and *latissimus* dorsi, right side	12	Normal action restored. Raced within 1 month of discharge.
58	9 y.o., T.B., b.g. (Racehorse, n.h.)	Lost form for 2 years. Occasionally lame left hind leg and for last 2 months always so after strong work	Tensor fascia lata and biceps fem', left side	5	Normal action restored. Raced same day as discharge and again 1 week later. Has since won and has been placed.
59	5 y.o., T.B., b.m. (Polo pony)	Lame right hind for some weeks	All adductors (*Gracilis*) right hind leg	7	Normal action restored.
60	5 y.o., T.B., b.g. (Hunter, P.-to-P.)	Very lame left fore leg for 1 week	*Posterior pectorals* and latissimus dorsi, left side	18	Normal action restored. Raced in point-to-point in one week and has since run 3 times.
61	3 y.o., T.B., b.f. (Racehorse, flat)	Lame left fore leg for 1 month	*Posterior pectorals* and latissimus dorsi, left side	10	Normal action restored. Has since raced 3 times, winning once and being placed twice.
62	12 y.o., T.B., br.g. (Racehorse, n.h.)	Lame left fore leg for 8 months, on and off but always after fast work	Anterior pectorals, *brachiocephalicus*, biceps brachii, brachialis and deltoid, left side	20	Normal action restored. Returned to training and has raced.
63	9 y.o., b.m. (Polo pony)	Lame right fore leg for 3 months	Anterior pectorals, right side	8	Normal action restored. Played polo 1 week after discharge.
64	8 y.o., b.m. (Polo pony)	Lame right hind leg for 2 months	Serratus dorsalis, longissimus dorsi and *gluteus medius*, right side	4	Normal action restored. Played polo within 1 week of discharge.
65	2 y.o., T.B., b.f. (Racehorse, flat)	Lame left hind leg for 4 months	*Biceps femoris*, and semimembranosus, left side	6	Normal action restored. Subsequently raced 6 times. Was placed twice.

Case number	Type	Reported disability	Pain exhibited in :—	Number of treatments	Result
66	9 y.o., T.B., b.g. (Racehorse, n.h.)	Old injury left fore suspensory lig'. Fired two years previously. Always lame after steady work	All flexor muscles of left forearm	18	Normal action restored. Subsequently raced 3 times. One win and twice placed.
67	3 y.o., T.B., b.g. (Racehorse, flat)	Lame right fore leg for 18 months	Anterior pectorals, *brachialis*, *biceps brachii* and deltoid	3	Normal action restored. Returned to training and subsequently raced 7 times being placed once. Later won over hurdles.
68	7 y.o., ch.g. (Polo pony)	Lame left fore leg for 14 days	Brachiocephalicus, *supraspinatus*, infra-spinatus and deltoid, left side.	8	Normal action restored. Played polo same day as discharge.
69	8 y.o., T.B., b.g. (Hunter)	Lame right hind leg for 18 months	Tensor fascia lata and *biceps femoris*, right side	5	Normal action restored.
70	9 y.o., T.B.,, b.m. (Hunter, P.-to-P.)	Lame right fore leg for 8 days. Severe sprain of right knee. Flexion limited by 50 per cent.	All extensor muscles of right forearm	8	Normal action restored. Won point-to-point within 14 days of discharge and another 7 days later.
71	6 y.o., ch.m. (Polo pony)	Lame right fore leg for 8 months	Anterior pectorals, *brachiocephalicus* and supra-spinatus, right side	20	Considerable improvement. Lameness recurred as soon as treatment ceased. Destroyed. Possible too strong adhesions.
72	3 y.o., T.B., b.f. (Racehorse, flat)	Lame left hind leg for 3 months	Biceps femoris and *semitendinosus*, left side	6	Normal action restored. Raced and placed within 1 week of discharge. Subsequently ran 5 times, gaining 1 win and 4 places.
73	3 y.o., T.B., b.f. (Racehorse, flat)	Lame right hind leg for 6 months	All adductors (*Sartorius*) right hind leg	15	Considerable improvement. Never quite sound. Sent to stud. Possible too strong fibrous adhesions.
74	6 y.o., T.B., ch.m. (Racehorse, flat)	Lame right hind leg, on and off, for 3 years, and always lame after stronger work	Tensor fascia lata and *biceps femoris*, right side	14	Normal action restored. Subsequently ran 12 times gaining 6 wins and 3 places.
75	3 y.o., T.B., ch.g. (Racehorse, flat)	Lame right fore leg for 3 weeks. Strain of left fore suspensory ligament	All flexor muscles of left forearm	3	Normal action restored. Subsequently raced many times.
76	2 y.o.T.B., b.f. (Racehorse, flat)	Lame right hind leg for 6 months	Tensor fascia lata and *biceps femoris*, right side	3	Normal action restored. Returned to training and raced.
77	3 y.o., T.B., b.c. (Racehorse, flat)	Lame left hind leg for 2 months	Biceps femoris and *semitendinosus*, left side	4	Normal action restored. Subsequently ran 10 times, gaining 2 wins and 4 places.
78	10 y.o., g.g. (Hunter)	Lame left fore leg for 6 months	*Brachiocephalicus* and supra-spinatus, left side	8	Normal action restored.
79	5 y.o., T.B., b.g. (Racehorse, n.h.)	Severely jarred shoulders, Very restricted action in front for over 6 months	Posterior pectorals and *latissimus dorsi*, both sides	6	Normal action restored. Raced and was placed within 16 days of discharge.
80	7 y.o., ch.g. (14h child's pony)	Lame left fore leg for 6 months	*Brachiocephalicus* and supra-spinatus, left side	1	Normal action restored.
81	4 y.o., T.B., br.c. (Hack)	Lame right hind leg for 2 months	Adductors and *semimembranosus*, right side	4	Normal action restored.
82	4 y.o., T.B., b.c. (Racehorse, flat)	Restricted action both fore limbs	All extensor muscles of both fore legs	8	Normal free action restored. Won important race on day of discharge and subsequently was placed twice.
83	17 y.o., b.g. (Hunter)	Very lame left hind leg for 4 months, following kick on stifle	All extensor muscles of left stifle	2	Normal action restored.
84	3 y.o.T.B., ch.f. (Racehorse, flat)	Lame right hind leg for 8 months	All adductors (*sartorius*) of right hind leg	12	Normal action restored. Subsequently raced 4 times, 1 win and 2 places.
85	8 y.o., T.B., b.g. (Hunter)	Lame right fore leg for 2 months	Anterior pectorals, right side	1	Normal action restored.
86	8 y.o., b.g. (Event horse)	Lame right hind leg for some weeks	Tensor fascia lata and *biceps femoris*, right side	4	Normal action restored. Has since won 2 important events.
87	5 y.o., T.B., br.g. (Racehorse, n.h.)	Lame left fore leg for 2 weeks	Anterior pectorals and *brachiocephalicus*, left side	4	Considerable improvement. Treatment not completed. Owner decided to turn out the animal for the summer.
[88	5 y.o., T.B., b.g. (Hunter, P.-to-P.)	Lame behind for 12 months. Possible injury to back	Longissimus dorsi and *gluteus medius*, left side. All adductors (*sartorius*) right hind leg.	16	Normal action restored.

Case number	Type	Reported disability	Pain exhibited in :—	Number of treatments	Result
89	9 y.o., T.B., ch.g. (Racehorse, n.h.)	Severe injury to right side of neck and right shoulder. Very heavy fall whilst racing previous day	Practically all muscles right side of neck and especially *brachiocephalicus serratus cervicis* and *trapezius cervicalis*	12	Normal action restored. Raced within 13 days of discharge and subsequently ran 5 times, winning twice.
90	6 y.o., b.g. (Event horse)	Lame left fore leg for 8 weeks	Extensor carpi radialis, *common digital extensor*, and ulnaris lateralis, left fore leg	6	Normal action restored.
91	2 y.o., T.B., br.c. (Racehorse, flat)	Lame right fore leg for 2 weeks	Anterior pectorals and *brachialis*, right side	6	Normal action restored. Has since raced.
92	9 y.o., b.g. (Hunter, P.-to-P.)	Lame left fore leg for 3 weeks	Anterior pectorals, *brachiocephalicus* and brachialis, left side	8	Some improvement. Treatment not completed as owner decided to turn out. End of season.
93	8 y.o., T.B., b.g. (Racehorse, n.h.)	Severely jarred shoulders. Very restricted front action for some months	*Latissimus dorsi* and *serratus thoracis*, both sides	6	Normal action restored. Returned to training.
94	4 y.o., T.B., b.c. (Racehorse, n.h.)	Flexion of right knee limited by about 30 per cent. following injury to right forearm, 3 months previously	All extensor muscles of right forearm	8	Normal knee movement restored.
95	9 y.o., b.g. (Riding horse)	Lame right fore leg for 3 months, following kick on point of shoulder	Anterior pectorals, *brachialis*, *biceps brachii*, *deltoid*	4	Normal action restored.
96	Yearling, T.B., g.f.	Lame right fore leg for 6 months, following fall. Gross wasting of right triceps	Right *triceps*, *latissimus dorsi* and serratus thoracis	12	Normal action restored. Muscle bulk normal.
97	4 y.o., T.B., g.c. (Racehorse, flat)	Lame left fore leg for some weeks	Posterior pectorals, *serratus thoracis* and *latissimus dorsi*	6	Normal action restored. Returned to training.
98	5 y.o., ch.g. (Show pony)	Lame left fore leg for 2 months	Anterior pectorals and *brachiocephalicus*, left side	7	Normal action restored.
99	3 y.o., T.B., b.f. (Racehorse, flat)	Very lame left fore leg (on 3 legs) for 7 days, following fall on to left shoulder on pulling-up after racing	Anterior pectorals, *brachiocephalicus*, *brachialis*, *biceps brachii* and serratus thoracis	4	Normal action restored.
100	4 y.o., T.B., b.c. (Racehorse, flat)	Lame right fore leg for 3 months	*Anterior pectorals*, brachialis and biceps brachii, right side	4	Normal action restored. Raced and won within 1 month of discharge.

Observations on the Serum Proteins of Afrikander, Mashona and Ngami Cattle.—*Concluded.*

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Bronchostrongylus subcrenatus (Railliet & Henry, 1913) a new Parasite Recorded from the Domestic Cat

BY

W. M. FITZSIMMONS

Commonwealth Bureau of Helminthology, St. Albans, Herts.

SUMMARY.—This paper places on record for the first time the occurrence in the cat of the lungworm Bronchostrongylus subcrenatus *hitherto only recorded from leopards and tigers. A brief account of what is known of its systematics and life-history is followed by a short description and a note on its differentiation from a similar lungworm of the domestic cat. The lungworms were collected from a cat in Blantyre, Nyasaland.*

History

THIS species was first recorded by Railliet and Henry in 1913 as *Haemostrongylus subcrenatus* and the type host was given as *Felis pardus*, a leopard from the Belgian Congo. It was recorded a second time by Cameron, in 1931 from a Malayan tiger in the Edinburgh Zoological Gardens. He named a new genus, *Bronchostrongylus* Cameron, 1931, for its reception.

Life-history

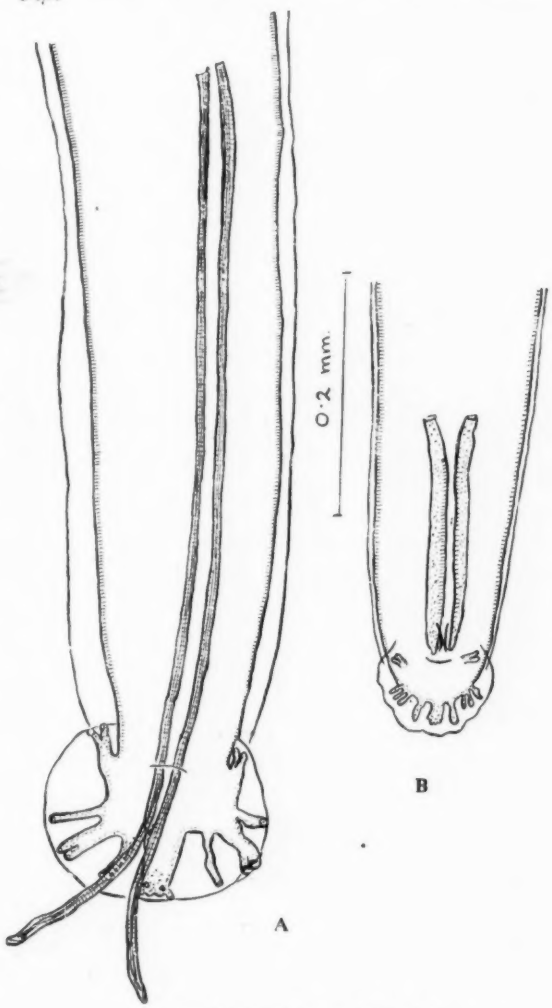
The life-cycle for the genus has been worked out by Gerichter for *Bronchostrongylus brevior* (Gerichter, 1948) a parasite of *Felis ocreata* and *Catolynx chaus*. First-stage larvae appear in the faeces of the host and are able to survive in water for 3 to 4 weeks at 16° to 20° C. They enter a molluscan intermediate host and, at optimum temperatures of 22° to 27° C. and in a suitable mollusc, infective larvae appear on the eighth day. First-stage larvae appeared in the faeces of an experimental kitten 28 days after it had been fed snails containing infective larvae. The following molluscs were used by Gerichter: *Chondrula septemdentata, Helicella barbesiana, H. vestalis joppensis, Monacha syriaca, Retinella nitellina, Theba pisana,* and *Limax flavus*. Gerichter also demonstrated that mice may act as an auxiliary or transport host for infective larvae by eating an infected snail and then carrying encysted infected larvae on the surface of the lungs for at least 120 days.

Short Description

Buccal capsule absent, mouth surrounded by 6 small lips, 4 larger sublateral and 2 smaller lateral. Oesophagus club-shaped, from 290 to 335μ long. Cuticle conspicuously inflated at anterior end of worm, a ventral transverse cuticular groove present at about the level of the middle of the oesophagus.

Male 10 to 12.5 mm. long. Spicules finely striated, slender and flanged, 780 to 940μ long. Gubernaculum absent. Bursa inconspicuous and supported by short stumpy rays.

Female 20 to 23 mm. long. Tail conical and bluntly pointed, 190 to 250μ long. Vulva slightly behind the middle of the long axis of the body. Embryonated eggs measure 75 to 85μ by 45 to 54μ.



A.—*Bronchostrongylus subcrenatus.*

B.—*Aelurostrongylus abstrusus.* Posterior extremity of male, ventral view, showing bursa and spicules.

Bronchostrongylus subcrenatus bears a superficial resemblance to another lungworm of cats, *Aelurostrongylus abstrusus* (Railliet, 1898). The most

obvious differences are given in the following table:—

	B. subcrenatus	*A. abstrusus*
Total length of male	10 to 12.5 mm.	5.2 to 6.0 mm.
Total length of female	20 to 23 mm.	10.0 to 10.4 mm.
Spicule length	0.78 to 0.94 mm.	0.13 to 0.22 mm.
Spicule appearance	long and slender	stout
Position of vulva	near middle of body	near anus

In addition, the arrangement of the bursal rays differs as illustrated in the drawings.

Acknowledgment.—The writer expresses his thanks to the Director of the Commonwealth Bureau of Helminthology for permission to publish this paper.

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Clinical Note

A Case of Intussusception in a Six-month-old Calf

BY

D. H. W. BROWN and D. A. PARKES

Chepstow

SUMMARY.—A case of intussusception in a 6-month-old calf is recorded with symptoms and successful surgical treatment by enterectomy.

Subject. A pedigree 6-month-old Friesian heifer calf out at grass.

History. The owner had noticed on the afternoon of May 1st that the calf had become separated from the others and was exhibiting vague symptoms of colic. The animal was put into a loose-box and was examined on the afternoon of the next day.

Symptoms. According to the owner, faeces had not been passed for at least 24 hours. The temperature was normal, the animal was extremely restless, showing symptoms of acute abdominal pain, kicking at the right side of the abdomen, etc. Accompanying this acute pain syndrome, a characteristic hollowing of the back was displayed, the animal finally walking several steps backwards. Between these periodic bouts of pain, a stretching attitude was adopted. Rectal examination was carried out with difficulty and a small quantity of mucilaginous tarry faeces was found to be present in the clinging rectum. Palpation in the right sub-lumbar region evinced considerable pain but no definite abnormality of any abdominal viscus could be detected. Tentative diagnosis of obstruction due to a twist or intussusception was made.

Anaesthesia. Paravertebral anaesthesia—last dorsal, first and second lumbar.

Operation. With the calf in the standing position, a vertical incision, approximately 6 inches, was made in the right sub-lumbar fossa, 2 inches from the last rib and 4 inches below the transverse process of the lumbar vertebrae.

Exploration of the abdominal cavity finally revealed what appeared to be an enlarged part of small intestine approximately 3 inches in diameter and 9 inches long. In order to exteriorise the affected bowel, the incision was extended a further 2 inches ventrally and the diagnosis of intussusception was confirmed. The intussusception was gently reduced and upon final reduction it could be seen that necrosis of the intussuscipiens had already occurred and it was decided to resect approximately 2 feet 6 inches of the affected small intestine.

Intestinal clamps were placed about 1½ inches above and below the proposed points of resection and the mesentery was split between these points and ligatured at the base. The affected portion of intestine was then excised and the whole removed. The cut ends of intestine were aligned by means of the forceps and the ends were united by Connell sutures using 00 chromic catgut with an atraumatic eyeless needle. The rent in the mesentery was closed with an interrupted suture. The forceps were then removed and patency of the anastomosis was established by manually effecting passage of intestinal contents. Two crushed 400 mg. tablets of chlortetracycline were placed in the abdominal cavity. The abdominal incision was closed with gold sutures using braided nylon 18 lb. breaking strain, and 5 million I.U. of crystalline penicillin were injected intramuscularly.

Post-operative Treatment. The calf was seen the following day and a dose of 4 c.c. of procaine penicillin (300 units per c.c.) was injected. The animal had drunk a little milk but was still in pain and had not passed any faeces. The next day it had improved and was eating a little hay; it passed a few blood-stained faeces. On Friday, 4 days after the operation, the calf was ruminating and passing normal faeces, and from then on the recovery was uneventful.

The stitches were removed on May 12th (11 days after the operation), and the calf appeared normal.

BOOKS RECEIVED

The Grass Crop—Its Development, Use, and Maintenance. By W. Davies Spon. London (2nd edition, 1961). 45s.

The Popular Whippet. By C. H. D. Todd. Popular Dogs. London (1961). 21s.

Popular Dog Breeding and Genetics. By Eleanor Franklin. Popular Dogs. London (1961). 21s.

Flow Properties of Blood and Other Biological Systems. A. L. Copley and G. Stainsby (eds.). Pergamon Press. Oxford (1960). 75s.

Current Literature

BOOK REVIEWS

Reproduction in the Dog. By A. E. HARROP. Baillière, Tindall and Cox, London (1960). 30s.

There is a crying need for just such a book as this to fill but one of the gaps in clinical text and its publication has therefore been awaited with keen anticipation.

Misgivings were at once aroused, however, by the statement repeated in Foreword and Preface to the effect that the book is designed for veterinary practitioners, research workers, students, and dog breeders. To produce a text-book at once suited to these widely differing needs is a virtual impossibility and the task has certainly proved beyond the author's reach, the standard of writing being in some instances far beyond the comprehension of the most intelligent layman but in many more instances failing to reach that required by undergraduate or graduate veterinarians.

The early part of the book contains a very good chapter on anatomy, an excellent and almost unnecessarily exhaustive one on histology of the reproductive organs, followed by the physiology of reproduction, mating (natural and artificial), and thence in logical sequence to pregnancy, normal parturition, dystocia, and surgical procedures.

This section is rounded off by a contributed chapter on canine paediatrics which contains 2 such incredible errors that it is difficult to treat the rest of the chapter seriously. Another contributed chapter on nutrition and its effects on reproduction, and one by the main author on infertility conclude the book.

The main author would not appear to have exercised his undoubted prerogative of supervising and dovetailing the contributions of his subsidiary authors, hence there is a good deal of duplication, overlapping, and even occasional outright errors. For this he must undoubtedly be held responsible. The result is, for example, that multiple reference occurs under various headings to such a bizarre and relatively rare condition as gravid inguinal metrocoel, thus giving the subject an importance quite unrelated to its clinical significance which to say the least is apt to mislead students and inexperienced clinicians. The choice of illustrations is sometimes odd and many lack adequate legends ; one such, of whelping forceps, does not even appear in the chapter to which it relates, whilst the diagrams included in the section on surgical intervention are of such general surgical interest that they would be better in a book on general surgery, making space here for diagrams of the specific operative technique described.

Whilst in general it is undesirable to include detailed criticisms in book reviews it does seem that an exception must be made here having regard to the fact that, by its very nature and title, this book bids to become a standard text-book and it is therefore highly undesirable in the interests of readers that factual errors and statements of doubtful authenticity shall pass unchallenged.

As a whole the clinical material lacks authority and the precision which only long practical experience can give ; for example, normal parturition is dealt with largely by generalisation and there is no attempt to describe stages of labour let alone the physiological changes underlying them—far better material has been included in books intended only for the lay reader !

A few of the more detailed criticisms are appended :—

The paragraph on puberty included a very vague statement regarding descent of testicles in the puppy, a subject of great topical importance in the light of the cryptorchidism controversy, neither does it coincide with other observers' findings in that testicles are usually intra-abdominal at birth but in or very near the scrotum by the tenth day, not as suggested by the author.

The author is to be congratulated on at last placing full emphasis on the part played by the bitch in the " tie " but unfortunately follows on by making an extraordinary and totally inaccurate statement to the effect that Chows rarely tie !

One wonders on how many case records and breeds the author bases the statement that it is more usual for a bitch to go beyond the 63rd day of pregnancy rather than whelp earlier. Twenty years' experience of a practice in which expected whelping dates of patients are booked and then subsequently the actual date of whelping is known suggest the converse to be true.

The introductory paragraph on normal parturition is scarcely likely to be agreed by experienced clinicians upon whose ability to recognise the enormous breed variations in whelping patterns will depend their success and reputation in canine obstetrics. Surely the author does not consider that some of the monstrously man-altered breeds conform to a uniform whelping pattern ?

The paragraphs on complications of parturition are quite inappropriate to a chapter on normal whelping and should have been left to that on dystocia, thus obviating irritating repetition.

The author of the section on dystocia gives first place to discussion of various less common types of maternal dystocia which, although they are described as uncommon, is likely to suggest quite the wrong emphasis to the uninitiated.

Since anaesthesia is such a vital factor in successful Caesarean section it is dismissed remarkably briefly in 2 short paragraphs ; surprising omissions are the use of narcosis with epidural or local infiltration anaesthesia, both methods in regular use by some experienced canine surgeons. The various subheadings in this chapter are confusingly arranged so that at one point 2 types of incision for Caesarean section are discussed before one reaches the section entitled Caesarean section ! Although the author discusses various types of flank incision he surprisingly omits the one most favoured by those surgeons who are exponents of the flank approach, *viz.* the oblique upwards and backwards incision along the long axis of a foetus approaching the uterine body.

Care of puppies born by Caesarean section is dismissed with extreme brevity and one gains the

unfortunate impression that the writer regards this aspect of canine obstetrical surgery as unimportant.

The chapter on canine paediatrics is open to grave criticism by virtue of 2 really unforgivable errors, namely the describing of a canine hookworm as *Dirofilaria immitis* and of a round worm as *Diphylidium caninum*, this latter not even correctly spelt. Such fundamental errors cause one to view the rest of the text, perhaps unfairly, with great scepticism.

The information on teething is far too vague—in normal breeds the permanent dentition appears with monotonous regularity almost to a day that such lack of precision is unwarranted. The brief references to virus diseases are too generalised to convey any clinical picture of the diseases described and on balance would probably have been better omitted from a book of this type.

It is indeed regrettable that a book with such tremendous possibilities should fall so far short of what is necessary for any authoritative work likely to become a text-book of reference for veterinary clinicians—the best that can be said of it is that, like the curate's egg, it is good in parts.

Finally, the standard of production falls short of what one might reasonably expect of a present-day publication.

The Structure of the Fowl. By O. C. BRADLEY and T. GRAHAME. Oliver and Boyd, Edinburgh (1960). 25s.

A knowledge of the structure and function of an animal in health has always been regarded as essential to the proper understanding and investigation of the many different factors capable of interfering with normal function and causing disease. Since the first edition was published in 1915, this popular text-book on the structure of the fowl and development of the chick has gone a long way to meeting the needs of those wishing to increase their efficiency in the neglected field of avian disease. The new fourth edition of the book contains several important additions.

The chapter on the skeleton is expanded by an account of the structure and formation of bone. There is a completely new chapter on the blood with a colour plate. The chapter on the circulation is expanded by additional text concerning the kidney circulation, and that on the nervous system by several pages on the autonomic system.

There are additional figures and plates to illustrate the new chapters and sections. The photographs of vinylite casts of the excretory vessels and blood vessels of the kidney are outstanding.

This book has always been surprisingly cheap to buy and the profusely illustrated new edition, with its 36 plates and 90 text figures is well worth the increased price. It is a worthy addition to the private libraries of students, veterinary surgeons in practice, and all research workers whose interests are concerned with avian pathology, physiology, and embryology.

Addendum 1960 to the British Pharmacopoeia 1958. Published for the G.M.C. by the Pharmaceutical Press, London (1960). 30s.

This volume contains 49 monographs on new substances and many amendments to preparations listed in the 1958 B.P. Like the parent volume, the Addendum is intended for the use of pharmaceutical chemists and is almost entirely confined to defining the preparation and testing of drugs. Actions and uses are *not* described as they are in the B.P. Codex and B. Vet. Codex. This publication is not of wide interest to veterinary workers in practice or laboratory. It remains, however, an essential reference book for inclusion in libraries catering for veterinarians.

Several of the items will separately have direct importance for specialised veterinary scientists and general interest to others. For instance, there are very full descriptions of the preparation and biological testing of smallpox, poliomyelitis, B.C.G. and other vaccines, and new requirements for P.P.D. tuberculin. Also included are new monographs on tri-iodothyronine (Liothyronine) and on long acting corticotrophins, together with an appendix on the biological assay of corticotrophins. A new standard procedure for assay of vitamin A is given in precise detail. The B.P. table of standard biological activities, which defines potency in units per milligram, is brought up to date for 13 hormones, antibiotics, sera, and vaccines. Other items of possible interest to some veterinarians, make reference to Halothane, to several salts of Hydrocortisone and of Phenoxymethyl-Penicillin ; to Phytomenadione, Piperazine, Suramin and to the cheap non-toxic antithyroid drug, potassium perchlorate.

Journal of Comparative Biochemistry and Physiology. Volume 1, Number 1. January, 1960. Pergamon Press, Oxford. Individual Subscribers 105s. *per annum*. Libraries £14 *per annum*.

". . . the true aim of biological science must be to derive the entire process of life's unfolding in all its forms from the fundamental properties of matter and energy. To bring the maximum of rationality and comprehensibility into the universe we cannot restrict ourselves to one phylum alone, the vertebrates, still less just to the mammals."

These words, taken from the foreword written by J. Needham, sum up the intention of this new journal. Papers are to be published that contain results of original research on the biochemistry and physiology of animals, especially where the subject is approached from a comparative point of view. Papers dealing with clinical or mainly the applied aspects of the subject will not be considered.

The first issue, of about 100 pages, may be taken as an indication of these intentions, containing among its 8 papers contributions on " Aspects of the intermoult cycles in natantians," " A comparison of blood carbonic anhydrase of various mammals," " Ureogenesis in elasmobranch fishes," and " A cardio-accelerator present in tissue extracts of the snail *Helix aspersa*."

The presentation is of a high standard, with the illustrations clear and well arranged. No doubt this international journal will prove of great interest to several academic disciplines, but it will rarely be of interest to the veterinary surgeon.

News and Comment

B.V.A. HANDBOOK ON SKIN DISEASES

An addition has been made to the current range of B.V.A. handbooks, and a new one, *Aspects of Skin Disease of the Dog and Cat* has just been published and is now available to members free of charge *on application*. This handbook, which will be reviewed at an early date in our columns, has been produced by a sub-committee of experts in this field and will be of great practical value to members in small-animal practice. Please apply for copies to the B.V.A., 7, Mansfield Street, London, W.1.

A.V.S. CONFERENCE, 1961

The eleventh annual conference of the Association of Veterinary Students was held in New Brighton, Wallasey, from January 20th to 22nd; 350 students attended representing the 8 colleges of the British Isles and there was one student from Yugoslavia.

In his address of welcome the Mayor of Wallasey, Alderman C. G. E. Dingle, J.P., said that he felt proud that the Liverpool School had accommodated the conference in Wallasey especially since he was anxious to see Wallasey become a conference town. He stressed the importance of such conferences not only for the benefit obtained from the presentation of papers, but especially for the advantages of contacts made between members of professions. The Mayor extended a warm welcome to the delegates on behalf of the Corporation and said that the conference would be an event during his year of office he would look back on with pride.

Mr. G. N. Gould, J.P., senior vice-President of the R.C.V.S., opened the conference. He said that the veterinary profession has made a vast contribution to the higher standard of living people enjoy to-day, and the responsibilities of the profession to the world of the future would be great. Mr. Gould referred to the achievement of the profession in the eradication of bovine tuberculosis. He felt that this event had been passed by with little public comment, but none the less it was one of which the profession could feel intensely proud and one which has had enormous economic effects. He went on to say that students do not always appreciate the facilities now available to them, and made special reference to the lack of competition for the Royal College prizes. He concluded by saying that a constructive approach from students is always welcomed by those in authority.

Professor J. G. Wright, Dean of the Faculty of Veterinary Science, Liverpool University, thanked Mr. Gould for coming to open the conference.

A symposium was presented during the latter half of the morning. The subject was "The Veterinary Profession—Past, Present and Future." Speaking of the past, Mr. J. W. Barber-Lomax traced the events in the history of the profession from its inception to 1940 and made special reference to the establishment of the Royal College. The period from 1940 up to, and including the present, was dealt with by Mr. L. G. Anderson. He referred in particular to the Veterinary Surgeons Act of 1948 and the effect it has had on the profession. Mr. Anderson also said that despite the increased number of veterinary surgeons there was no unemployment and indeed some practices were still undermanned.

Professor J. G. Wright presented his assessment of the future and painted what he hoped would be a happy picture. His ideas for a future structure for the profession were of particular interest.

In the discussion that followed the symposium, several questions were asked by delegates. Mr. Anderson thought that it would be a good thing for students to carry out surgical techniques on live animals if this could be made possible. Professor Wright, however, made clear that students of the profession enjoyed an advantage that medical colleagues had not to the same extent—the opportunity to practise on the cadaver. He added that admission to membership of the Royal College in no way marked the end of learning.

At the meeting of Council the future policy of the Association was discussed and it was felt that more meetings should take place between representatives of the colleges throughout the year, to discuss problems that might arise for students. Mr. P. L. Bardgett of the Liverpool School, the present secretary, was elected to the Presidency for the next year.

In the evening the Liverpool University Veterinary Society held a reception for Council and the women delegates were entertained at a cocktail party. There then followed the annual A.V.S. dance at the Students' Union.

On Saturday delegates visited the Liverpool University Field Station at Leahurst and saw surgery demonstrations by Professor Wright and the staff over closed-circuit television. The new departments of Veterinary Anatomy and Pathology in Liverpool were also visited.

The Wooldridge Cup was retained by last year's winners, London, since this year's match was drawn with neither side scoring. In the evening a civic reception and dinner was given by Wallasey Corporation for the A.V.S. Council.

At the Annual General Meeting on Sunday the secretary thanked the Wallasey Corporation for their hospitality. The treasurer reported that the conference was likely to be a financial success thanks to the generosity of the Corporation and of industry. The editor of the journal stated that a larger edition was being prepared and he hoped it would meet with approval.

The President of the International Veterinary Students Union, Mr. M. A. Gordon, pointed out that opportunities for seeing practice abroad were available to students in the British Isles on an exchange basis. He also said he hoped the first edition of an I.V.S.U. magazine would appear shortly.

The President of the A.V.S., Mr. J. Nolan, congratulated the Liverpool students on their excellent programme; he informed delegates that Glasgow had agreed to act as host college next year.

Mr. P. L. Bardgett, the President-elect, made reference to the work of Mr. Nolan and said he felt

there was now a wind of change blowing through the A.V.S. which would give opportunity for more interest.

THE SHARE-JONES LECTURES

The Share-Jones lectures are to be delivered this year by Dr. R. F. Montgomerie on February 6th and 7th in the Botany Lecture Theatre of the University College of North Wales, Bangor. Dr. Montgomerie has chosen for his subject "The Advance of Veterinary Science, 1920-1960."

HISTORY OF THE ROYAL ARMY VETERINARY CORPS.

The Director of Army Veterinary and Remount Services writes to say that, thanks to the help of the B.V.A., a total sum of about £1,000 is now available towards the cost of publishing the History. Members have responded generously to the appeals made in THE VETERINARY RECORD and the Director expresses his indebtedness to them. The total estimated cost is some £2,000, and further donations would be very welcome.

PIDA AWARDS FOR RESEARCH

Eight-week summer vacation scholarships worth £65 each will be awarded to students in agriculture, veterinary medicine, economics, statistics or other appropriate subjects, by the Pig Industry Development Authority.

In addition post-graduate training scholarships with annual values ranging from £500 to £750 are offered to graduates in the same subjects, and several senior fellowships are available with values ranging from £900 to £1,250.

Fifteen graduates are already engaged in pig research as a result of scholarships previously awarded by the Authority.

RUSSIAN ENTRANTS TO BRITISH HORSE RACES

In reply to questions in the House of Commons last Thursday about the entry of Russian horses into the United Kingdom, the Minister of Agriculture said:—

"The Order which was made last September under the Diseases of Animals Act, 1950, prohibits the importation into Great Britain of horses from a number of countries, including the U.S.S.R. The advice at that time of an international organisation concerned with animal diseases was that these countries either had African Horse Sickness within their borders or were dangerously close to affected countries.

"An international meeting was held last week to review developments and consider future policy. As a result of the further information given at this meeting, the Secretary of State and I are advised that the situation in the U.S.S.R. and the countries immediately bordering it does not justify continuing the prohibition on the importation of horses from the U.S.S.R. An amending Order, will, therefore, be made removing the U.S.S.R. from the list of prohibited countries. The prohibition will be replaced by a procedure under which the U.S.S.R. Government, or any other Government from whose country we import horses, will be required to certify that the particular horses and the premises from which they come are disease free, and that African horse sickness has not existed in the country concerned for at least twelve months."

THE REGISTER OF VETERINARY SURGEONS

The undermentioned graduates were admitted to membership of the Royal College on January 14th, in virtue of the registrable degree of B.V.M.S. of the University of Glasgow:—

Adshead, Philip, 30 Worsley Crescent, Dialstone Lane, Stockport, Cheshire; Akpata, Richard Ikponmwosa, 1 Mission Road, Benin City, Nigeria; Barclay, Donald Fergusson, Ashley Gardens, Banbridge, Co. Down; Calder, Kenneth Hylton, 12 Rosslyn Terrace, Glasgow, W.2.; Cowie, Alexander Carnegie, 59 Ellon Road, Bridge of Don, Aberdeen; Dalgleish, Margarita Ogston (Miss), "Dalston," Burnbrae Gardens, Falkirk, Stirlingshire; Rickerby, Nancy Violet (Miss), 46 Malvern Street, Newcastle upon Tyne 4; Veitch, Ernest Ronald, 5 Killermont Road, Bearsden, Glasgow; and Williams, Gwilym Rhys, Tai Uchaf Dairy Farm, Bodedern, Holyhead, Anglesey, N. Wales.

The undermentioned graduates were admitted to membership of the Royal College on January 23rd, in virtue of the registrable degree of B.V.Sc. of the University of Bristol:—

George, David Bowen Lloyd, 9 Brynteg Place, Treharris, Glamorganshire; Gregory, Martin Wicksteed, 17 Thorncliffe Road, Oxford; Westcott, Mary (Miss), "Borholm," Stockport Road, Thelwall, Cheshire; and Whittard, Lawrence Mervyn, Coombe Farm House, Canford Lane, Westbury-on-Trym, Bristol.

BURNS SUPPER AT LASSWADE

The traditional annual Burns night supper was held at Lasswade on January 24th. Among members of the profession present were Dr. Stableforth, Dr. Russell Greig, Dr. Stamp, Dr. Wilson (Director of the Lasswade laboratory), and Mr. J. A. Anderson, General Secretary of the B.V.A. Another welcome guest was Mr. Bissett, late of the Scottish Ministry, an old and valued friend of the profession. To the general regret the Chief Veterinary Officer, Mr. J. N. Ritchie, C.B., was unable to be present and a letter from him was read to the company. After supper the guests were entertained to traditional music and dancing by the staff at Lasswade.

IN PARLIAMENT

Transit of Animals (Water Supplies)

Hansard of January 24th contained a full account of a Question raised on the adjournment by Mr. F. A. Burden on the Transit of Animals (Water Supplies). Mr. Burden recalled a recent occurrence, when it was alleged that a number of cattle stampeded near Newark railway station, being driven wild through lack of water. The House heard with close attention Mr. Burden's plea that safeguards should be established to ensure that various Acts and Orders were implemented so as to provide water for animals in transit. In the course of his observations he said he had written to the British Veterinary Association, and had received the following reply:—

"The Farm Livestock Committee of this Association discussed the regulations governing the transport of

animals by rail. These regulations are set out in the Transit of Animals Order of 1927 and further conditions are imposed by the veterinary staff of the British Transport Commission.

"The members of the committee are of the opinion that the regulations provide adequate safeguards in relation to feeding, watering and the number of animals conveyed in each wagon, and that the veterinary surgeons employed by the British Transport Commission are fully alive to the necessity for ensuring that animals are carried speedily and humanely as possible. However, we would stress the need for ensuring that animals are allowed access to water immediately before loading and that all employees of the Commission are aware of the provisions of the Order and of the necessity for implementing them."

Fowl Pest

On January 26th, a Parliamentary Question was asked about the number of birds destroyed during 1960, and the cost of compensation. The questioner suggested that this was "a rather dismal tale of ineffectual endeavour." For the Government Mr. Vane replied:—

"Far from being a rather dismal tale of ineffectual endeavour, it shows that very brisk action is being taken to deal with a disease which has threatened our poultry industry very extensively. Research into vaccines is going on all the time, and my right hon. Friend's predecessor was not slow to appoint a very distinguished Committee to go into this development when it became apparent that the disease was still increasing in this country."

PERSONAL

Mr. W. A. M. Gordon was admitted to the degree of Doctor of Philosophy at The Queen's University, Belfast, on December 20th, 1960. The title of his thesis was "Environmental Studies in Pig Housing."

Dr. R. F. Montgomerie will apear on the B.B.C. television programme "Farming" to-morrow (Sunday) at 12.40 p.m.

Mr. Colin D. Ross, O.B.E., Regional Director of the National Agricultural Advisory Service, South Western Region since October, 1946, will be retiring from the public service on March 9th. He will be succeeded on May 1st by Mr. E. Ll. Harry, O.B.E., at present Regional Controller of the Ministry's East Midland Region.

Birth

TAVERNOR.—On January 18th, 1961, to Susan, wife of Derek Tavernor, B.V.SC., M.R.C.V.S., at 93 St. Leonards Road, Chesham Bois, Bucks., a daughter, Angela Susan.

COMING EVENTS

February

7th (Tues.). 12th Anniversary Dinner-Dance of the University of Bristol Centaur Society at the Berkeley, Bristol.

8th (Wed.). SUSSEX VETERINARY SOCIETY. Ordinary General Meeting at the Dudley Hotel, Lansdowne Place, Hove, 2.30 p.m.

SCOTTISH METROPOLITAN DIVISION. Annual General Meeting at the Royal (Dick) School of Veterinary Studies, 2.30 p.m.

THE CAMBRIDGE SOCIETY FOR THE STUDY OF COMPARATIVE MEDICINE. Meeting in the Lecture Theatre of the School of Veterinary Medicine, Madingley Road, Cambridge, 8.30 p.m.

SOUTHERN COUNTIES VETERINARY SOCIETY. Meeting at the Polygon Hotel, Southampton, 7.30 p.m.

9th (Thurs.). Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 9 p.m.

SOCIETY FOR THE STUDY OF ANIMAL BREEDING. 9th Annual General Meeting at the Royal Society of Medicine, 1 Wimpole Street, W.1, 10.30 a.m.

ESSEX VETERINARY SOCIETY. Meeting at the George Hotel, Colchester, 7.30 p.m.

10th (Fri.). YORKSHIRE VETERINARY SOCIETY. Annual General Meeting at the Metropole Hotel, Leeds, 2.30 p.m.

ASSOCIATION OF VETERINARY FOOD HYGIENISTS. Meeting at the Corporation of Birmingham Abattoir, Sherlock Street, 2 p.m.

SHROPSHIRE VETERINARY CLUB. Meeting at the Oaks Hotel, Shelton, Shrewsbury, 8 p.m.

15th (Wed.). SOUTH EASTERN VETERINARY ASSOCIATION. Annual General Meeting at the Royal Star Hotel, Maidstone, 7.30 p.m.

WARWICKSHIRE VETERINARY CLUB. Meeting in the Regent Hotel, Leamington Spa, 7.30 p.m.

16th (Thurs.). HERTS. AND BEDS. VETERINARY SOCIETY. Meeting at the Sun Hotel, Hitchin, 7.30 p.m.

22nd (Wed.). SUSSEX VETERINARY SOCIETY. Joint Meeting with the local Division of the B.M.A. preceded by dinner at 7 p.m.

EASTERN COUNTIES VETERINARY SOCIETY. Winter Meeting at the Bell Hotel, Norwich, 12 noon.

CAMBRIDGE UNIVERSITY VETERINARY SOCIETY. 2nd Keith Entwistle Memorial Lecture in the Lecture Rooms, Mill Lane, Cambridge, 8.15 p.m. Speaker: Mr. T. Holmes Sellors, D.M., M.CH., F.R.C.S.

SCOTTISH BRANCH. Meeting at Glasgow University Veterinary Hospital, Bearsden, Glasgow, 2.30 p.m.

24th (Fri.). LIVERPOOL UNIVERSITY VETERINARY SOCIETY. Annual Ball in the Students' Union, Bedford Street, Liverpool, 8 p.m.

ASSOCIATION OF VETERINARY TEACHERS AND RESEARCH WORKERS (SOUTHERN REGION). 12th Annual General Meeting at the Royal Veterinary College, Royal College Street, Camden Town, London, N.W.1, 2.15 p.m.

27th (Mon.). EAST YORKSHIRE CLINICAL CLUB. Meeting at the Talbot Hotel, Malton, 8 p.m.

March

1st (Wed.). LANCASHIRE VETERINARY ASSOCIATION. Annual General Meeting at the Department of Veterinary Pathology, University of Liverpool, 2.30 p.m.

9th (Thurs.). V.V.B.F. NORTH OF SCOTLAND DIVISION. Annual Dinner and Dance in the Northern Hotel, Aberdeen, 7.30 p.m.

18th (Sat.). B.S.A.V.A. NORTH WESTERN REGION. Meeting at the Exchange Hotel, Liverpool, 7.30 p.m.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth Disease

Northants. Park Farm, Holme, Peterborough (Jan. 28).
Oxford. High Coggis Farm, Witney (Jan. 24).

Fowl Pest

Beds. Queen Street, Pitstone, Leighton Buzzard (Jan. 29).
Berks. Bowle Lane, Abingdon Road, Didcot (Jan. 27).
Bucks. Bye Green Farm, Weston Turville, Aylesbury (Jan. 25); Rising Sun Inn, Aston Clinton, Aylesbury (Jan. 26); Weston Mead Farm, Aston Clinton Road, Aylesbury; Mill House, Broughton, Aylesbury (Jan. 28).
Essex. Ables Road, Halstead (Jan. 24); Lamgford, Maldon (Jan. 26).
Hants. Heather View, Hutton Road, Ash Vale, Aldershot; Wits End, Ridgeway Lane, Lymington (Jan. 24); Revesby, Ornamental Bird Farm, Ash; Anglesey Farm, Ash Green, Aldershot (Jan. 27); Lower Mead, Hollywater, Alton (Jan. 28).
Hereford. Lower House, Staunton-on-Wye (Jan. 26).
Herts. Wilstone, Tring (Jan. 27).
Norfolk. School Road, Cantley, Norwich; Hill Top, Church Street, Horsford, Norwich; 10 New Road, Reedham, Norwich; The Retreat, Gurnery Road, Costessey, Norwich (Jan. 24); 18 Stone Cottages, Haveringland, Norwich; School Farm, Horsford, Norwich; 1, Council Houses, Horsford, Norwich; Mill Lane, Horsford, Norwich; Pied Bridge, Redenhall, Harleston; Tall Trees, Hall Lane, Drayton, Norwich (Jan. 25); Chapel Cottage, Westgate, Hevingham; Ipswich Road Allotments, Norwich; Mill Lane Farm, Horsford, Norwich; Grammar School Farm, North Walsham (Jan. 26); The Bungalow, Buxton Road, Cawston, Norwich; Manor Farm, Martham, Great Yarmouth; West View, Sutton, Norwich (Jan. 27); 222 Fakenham Road, Taverham, Norwich; 25 Church Road, Itteringham, Norwich (Jan. 28); The Red House Farm School, Buxton, Norwich; Tyby Farm House, Wood Dalling, Norwich; Brick Kiln Road, Hevingham, Norwich (Jan. 29).
Suffolk. Southern Chicks Ltd., Brook Farm, Mickfield, Stowmarket; Hill Farm, St. Johns, Beccles (Jan. 24); Severalls Farm, Saxtead, Woodbridge (Jan. 27); Kirkley Sidings, Beaconsfield Road, Lowestoft (Jan. 28).

Swine Fever

Ches. Coney Greaves Farm, Little Budworth, Tarporley (Jan. 25).
Denbigh. Tyddyn-y-Graig, Llanelian, Colwyn Bay (Jan. 27).
Devon. Suddon Farm, Newton St. Petrock, Torrington (Jan. 24).
Durham. The Kennels, Mill House, Shincliffe (Jan. 24).
Essex. Hilltop Piggeries, Thorpe-le-Soken (Jan. 27).

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Umbrellas: Sheep, for the Use of

Sir,—We congratulate Mr. Dixon on his adept use of the current trend in advertising veterinary drugs.

We would suggest that he now adds to his therapeutic range the latest potent diuretic sponge, and the dagger blotter for lamb dysentery. No doubt he will find these as effective as his umbrella.

Yours faithfully,
MARTIN SENIOR.
C. R. E. HALNAN.

85, West Street,
Dunstable,
Beds.
January 26th, 1961.

Replies to Advertisements

Sir,—This problem has been a bone of contention to newly qualified men and women for some years and many letters have been written about it.

I feel that in years to come Mr. Marston will possibly find it judicial to use a box-number to gain new employment before giving his notice, or maybe the boot will be on the other foot and one day he will have in his own employment an assistant who is unsuitable.

I feel that the retention of box numbers in advertisements is essential since there are circumstances where keeping matters confidential is very important, and that, unfortunately, is not one of the attributes for which we are famed in our own affairs; so far as our clients are concerned confidence is expected and of course maintained; but as regards the characteristics and attributes of assistants and principals in firms where members have had employment this is not always the case.

A principal wants to have the chance of contacting and interviewing a prospective assistant before the latter's judgment has been swayed by another member who has worked in that district.

To receive no answer from a box number should surely give no cause for concern when there are so many positions vacant in the profession at the present time.

Yours faithfully,
J. E. JONES.

Swan Cottage,
Hingham,
Norwich.
January 30th, 1961.

An Unusual Case of Diabetes Mellitus in a Bitch

Sir,—I was interested to read Mr. Crighton's comments on my letter of January 14th.

I must agree that the test for urinary amylase might have been more informative had it been done on an aliquot of a 24-hour urine sample. In acute

pancreatitis, however, the values obtained may be increased from the normal of 6 to 30 Wohlgemuth units to several hundred, and may occasionally, be as high as 2,000 units, so that a gross abnormality of this type would be detected by examination of a single urine sample. In the case I reported, the value obtained was at the lower end of the normal range for single samples (in man) as quoted by G. A. Harrison in "Chemical Methods in Clinical Medicine" (J. & A. Churchill Ltd., London. 4th ed. 1957, p. 295).

Harrison states that the urinary amylase test "has proved a useful test of pancreatic efficiency, although it is still not decided whether diastase (amylase) is derived solely from the pancreas," and also refers to the test for serum amylase as follows: "In acute pancreatic disease amount (of serum amylase) is increased, but because there is rapid excretion, urine examination is more satisfactory."

In his letter, Mr. Crighton claims that abnormal values of amylase are always higher than normal in the human subject. I cannot reply from personal experience, but I would refer him once more to Harrison's book in which it is stated that in diabetes, in chronic pancreatitis and in carcinoma of the pancreas urinary amylase is usually normal or low.

The low-normal value in the case I described tended, therefore, to confirm diabetes and to exclude an acute pancreatis. It was certainly not diagnostic of itself, but fitted in with the other clinical findings. The main object of my letter was to compare the pathological condition of this bitch with the case recorded by Singleton and Rhodes. Since the test for urinary amylase had been done it seemed to be worth describing it in addition to the findings of the *post-mortem* examination.

Yours faithfully,
D. B. ROSS.

Animal Health Trust Farm,
Livestock Research Centre,
Stock,
Essex.
January 24th, 1961.

Veterinary Inspection of Laboratory Animals

Sir,—May I warmly support Mr. Hartley's plea for the appointment of one or more veterinarians as Home Office Inspectors under the Act of 1876? It is true that the present Inspectors are doing a fine job, which is highly appreciated, but the practice of restricting the choice of personnel to persons qualified in human medicine has three disadvantages. (1) It restricts the field in which Inspectors can be found, a particularly undesirable restriction in view of the very rare combination of high qualities which is indispensable. (2) Newly-appointed Inspectors have to learn their job, and the learning process would be shortened and aided if they already knew as much about animals as veterinarians know from their special training and experience. (3) The special knowledge of veterinarians would be helpful to their colleagues.

There is nothing in Section 10 of the Cruelty to Animals Act of 1876 to justify such restriction, which stems from the time when the court barber had already metamorphosed into a surgeon while the farrier had not yet metamorphosed into a veterinarian. It has taken the Home Office too long to discover that the farrier has caught up with the barber.

Yours faithfully,
C. W. HUME.

The Universities Federation for Animal Welfare,
7A Lamb's Conduit Passage,
London, W.C.1.
January 30th, 1961.

The Use of Magnesium Bullets to Control Experimental Hypomagnesaemia in Ewes Fed a Low Magnesium Diet

Sir,—As part of a series of experiments we have in progress to investigate the effects of low magnesium intakes on blood magnesium levels of sheep, we have recently completed trials with an experimental formulation of magnesium heavy pellets or bullets.* The heavy pellets were $1\frac{3}{4}$ inches in length and $\frac{3}{4}$ inches in diameter. They weighed 40 g., had a specific gravity of 4.0 and contained 10.8 g. of MgO. They were easily administered by means of an oesophageal balling gun. The magnesium heavy pellets were designed to remain in the rumen or reticulum and provide a daily release of magnesium over a period of 6 to 8 weeks.

The sheep used were 4-year-old, non-pregnant Cheviot ewes. These were fed good hay indoors for a preliminary period of 21 days. At the end of this period they were divided into 5 groups of 7 sheep and fed a basal diet of 650 to 700 g. of barley straw (0.03 per cent. Mg.) plus 100 g. of casein + 100 g. of sucrose per day. This supplies 200 mg. of magnesium per day. One group of 7 sheep was given 2 bullets and another was given 4 bullets. Two other groups had daily drenches of 150 mg. and 300 mg. of magnesium in the form of magnesium oxide (0.25 and 0.50 g. MgO respectively). The fifth group of 7 sheep acted as a control with no supplementary magnesium. After 27 days, the 150 mg. per day drench was reduced to 75 mg. and the 300 mg. per day drench was stopped completely.

At the end of a 6-week period the bullets were removed by rumenotomy, 38 being recovered from a total of 42 administered. All were found in the reticulum. One was lost from each of 2 sheep in the 2 bullet group, and 2 were lost from 1 sheep in the 4 bullet group. (One of these was recovered intact from the floor of the pen 14 days after administration.)

Analysis of the recovered bullets showed the mean daily loss per bullet over the 6-week period to be 73.6 ± 13.0 mg. for the 2 bullet group (range 61 to 93 mg.) and 74.2 ± 11.9 mg. for the 4 bullet group (range 51 to 86 mg.). It was noticeable that the bullets eroded more rapidly in some sheep than in others, but that within each animal the wear was fairly uniform.

Table I details the mean plasma magnesium values. The control group with no magnesium supplement

* Aspro-Nicholas Limited.

fell steadily from 1.78 to 1.09 mg. per cent. over the first 13 days and then remained constant at about 1.2 mg. per cent. over the remaining period. For the first 27 days, the other 4 groups deviated very little from a range of about 1.6 to 1.8 mg. per cent. and were very similar to one another. From the 13th day onwards there were very significant differences (P=0.01) between the control group and those receiving supplementary magnesium by way of bullets or as a daily drench.

TABLE I
MEAN PLASMA MAGNESIUM LEVELS (MG. PER 100 ML.) IN 5 GROUPS OF 7 CHEVIOT EWES

Days	Control	Daily drench mg. Mg. 150	300	2 Bullets	4 Bullets	Sig. difference of means P = 0·05	P = 0·01
0	1·78	1·76	1·75	1·79	1·76	0·24	0·31
2	1·69	1·77	1·70	1·91	1·85	0·21	0·29
5	1·49	1·64	1·48	1·62	1·60	0·23	0·30
8	1·43	1·58	1·48	1·57	1·69	0·25	0·34
13	1·09	1·64	1·78	1·75	1·75	0·24	0·31
18	1·15	1·71	1·61	1·85	1·76	0·20	0·27
22	1·25	1·79	1·76	1·77	1·93	0·24	0·32
27	1·20	1·79	1·83	1·83	1·85	0·21	0·29
		Daily drench mg. Mg. 75	Nil.				
30	—	1·65	1·59	—	—	—	—
33	1·27	1·71	1·50	1·73	1·90	0·21	0·28
36	—	1·50	1·35	—	—	—	—
39	1·31	1·65	1·19	1·65	1·81	0·23	0·31
43	—	—	—	1·53	1·79	—	—
46	1·23	1·60	1·16	—	—	—	—

From the 27th day, the mean plasma magnesium values of the group which was reduced from 300 mg. per day to nil fell steadily from 1.8 to 1.2 mg. per cent. The rate of fall was very similar to that of the control group over the first 13 days of the experiment.

When the 150 mg. drench was reduced to 75 mg., the mean plasma magnesium level fell from 1.79 to 1.50 mg. per cent. over the next 9 days, but thereafter seemed to rise slightly to 1.65 mg. per cent.

The 4 bullet treatment maintained the plasma magnesium level at about 1.8 mg. per cent. over the whole 6 weeks, but there were indications that after about 33 days the blood magnesium levels of the 2 bullet group began to fall and at the 44th day had reached a level of 1.53 mg. per cent.

It is obvious that lactating ewes would have higher magnesium requirements than for those under the conditions of this experiment, but at grass they have much greater intakes. This present experiment shows that as little as perhaps 100 mg. of magnesium per day may make all the difference between markedly hypomagnesaemic animals at 1.1 to 1.2 mg. per cent. and those more normal sheep at levels of 1.7 to 1.8 mg. per cent. If such a narrow margin should exist for lactating ewes at grass then magnesium bullets may well be a practicable supplement and experiments are being planned to investigate this.

Full details of this experiment will be published elsewhere in due course.

We should like to thank Mr. S. Jennings and Mr. R. S. Jones for carrying out the rumenotomy operations and the technicians in this department for help with the magnesium analyses.

One of us (N.S.R.) is indebted to the R.C.V.S. Trust for the award of a B.O.C.M. Fellowship.

Yours faithfully,
R. G. HEMINGWAY,
N. S. RITCHIE,
J. S. S. INGLIS,
R. M. PEACOCK.
Department of Animal Husbandry and Veterinary Preventive Medicine,
University of Glasgow Veterinary Hospital,
Bearsden Road, Glasgow.
January 24th, 1961.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th January, 1961		11	—	11	145	—	38
Corresponding period in	1960	17	—	4	235	—	68
	1959	8	—	—	33	—	55
	1958	7	—	15	75	—	48

TUBERCULOSIS ORDER OF 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period 1st October to 31st December 1960, was 1.